Landmark Trees

Our ref: CZL/12PVW/Lttr/01

Tony Cox
On behalf of
Sir Cameron Mackintosh
1 Bedford Square
London
WC1 3RB

5th March 2020

Dear Tony,

Re: Trees at 12 Park Village West, London NW1 4AE

I write with regard to the letter your client, Sir Cameron Mackintosh, has received from Hiscox which sets out the requirements for the trees at 12 Park Village West, London NW1 4AE to be inspected by a professional arboriculturalist. I can confirm that the trees at the 12 Park Village West were surveyed by our surveyor Kim Dear on the 5th of September 2019. The focus of this survey was to inform our report (CZL_12PVW_AIM_03b, 13th February 2020) assessing the constraints the trees pose(d) to a planning application, but consideration was also given to remedial works required in the interests of general husbandry; I can confirm that no further works were recommended: the trees had already been subject to a recent round of management under the auspices of Harris Bug Studio's (September 2019) report: C737 P 31012019 Proposed arboricultural works.

We note that not all the works in that report have been completed: T1 lime has yet to be removed, despite being identified therein as *causing extensive movement to the fabric of the garden and to the ground around the property, undermining stability and structures.* Similarly, we note that works recommended in our previous planning report (CZL_12PVW_AIM_02, 8th December 2015) do not appear to have been fully carried out: T22 plum in particular, being recommended for removal on grounds of decay / disease, and T16 lime being recommended for further investigation on suspicion of such. Notwithstanding this apparent omission, a notice to remove T22 was submitted to the council by Harris Bugg Studio in March 2019 and received no objection. Similarly, the lime tree received a

25% crown reduction in height (as T5 in C737 P 31012019) which may at Harris Bugg Studios' discretion have (temporarily) addressed our prior concerns. For the sake of thoroughness, we would always prefer to see the results of recommended investigations prior to works being undertaken. Copies of our reports to planning can be supplied in parallel with this letter but are too large to simply append here. A copy of the tree survey plan is though included here as an extract to aid tree identification.

I understand the coach house and adjoining studio are subject to long-term damage that is potentially the result of vegetation-related subsidence (and which informs the Hiscox letter and tree works requirements). We understand the damage is concentrated to the northern end of the coach house. We are reliant upon your comments as to the structural integrity of these main structures and drainage system. Drainage / water supply systems, if damaged, can allow roots to penetrate. If the system is sound or after repair, roots have little capacity. Fortuitously, as part of the site investigations informing planning, a number of trial pits and boreholes were excavated in 2015 and repeated at the local authority's (London Borough of Camden) request in January of this year, which have shed light on both the soil type and presence of roots from adjacent vegetation. The locations of these site investigations are shown on Figure 1 below.

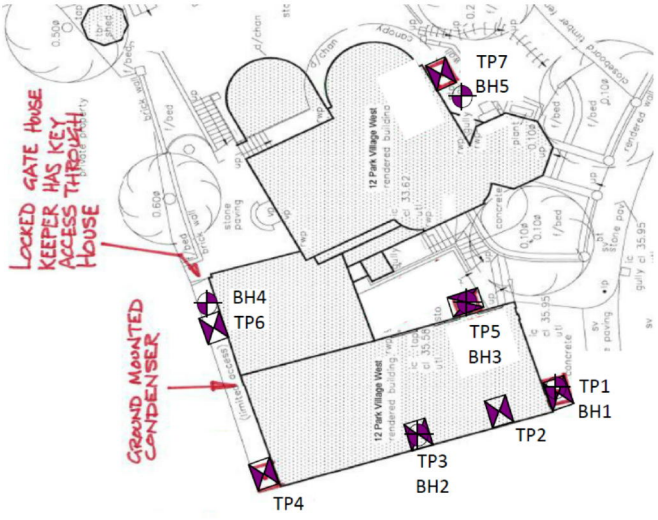

Figure 1: 2015 site investigation locations; the 2020 investigations to inform Camden's planning decision re-opened Trial Pits 1, 2, 3 and 4 as well as re-drilling boreholes 1 and 5. The mature lime tree (T1) near TP6 / BH4 was approved by the council for removal in 2019 and these adjacent pits were not reopened to inform the planning process, as the tree was no longer considered a material constraint on development.

The 2020 Connaughts site investigations (SI) found the soil to have a very high level of plasticity, which is indicative of a greater potential for volumetric change (associated with ground movement) and that the soil in general is borderline desiccated (associated with soil shrinkage) with some samples showing significant desiccation but others no desiccation (i.e. suggesting differential patterns of shrinkage across the site, which may lead to subsidence of low-rise buildings). It will be noted that two of the 2020 site investigations were located external to the garage and two were inside it. The trial pits inside the garage showed limited rooting within the foundation sections. Of the trial pits outside the garage, Trial Pit 1 showed rooting at or below foundation depth, whilst the depth of foundations could not be ascertained in Trial Pit 4 with rooting noted at the maximum excavated depth.

We note a possible misunderstanding in the SI report (para 1.4) that Landmark Trees would visit the site post investigation and 'log the roots': the purpose of our attending site (on 27/2/20) was to meet with Camden's Senior Tree Officer (Nick Bell) for planning purposes to determine the presence of tree roots as material constraints on development, not for positive / botanical identification as risk items to structures. The 2015 investigations though recorded in the same locations the presence of birch / hornbeam (TP1 & 2), lime (TP4) and London plane roots (TP6), as well as generic shrubs / creepers (TP1, 2 & 4). Though not of the same botanical family, birch and hornbeam are visually similar, and could be readily confused.

A species risk matrix (Table 1) is provided below, excluding trees at a distance beyond which they are unlikely to be relevant to building foundations, and considering those of relevance within the specific criteria, pertinent to this report. Those trees that are statistically (see below) close enough to be considered a higher subsidence risk, have their distance entered in bold text. NB the science informing these assessments and criteria is extremely thin (nor is data available for all species) and the London Tree Officer's Association advise in their Risk Limitation Strategy for Tree Root Claims (RLS) 2007) that it should be weighed against the amenity / BS 5837 category of the risk trees in question. Thus, the amenity value of the trees is also provided in the table. This latter consideration will be particularly important here where the site lies within a Conservation Area and the Local Authority consent is required for all tree works.

In terms of best statistical predictions, about damage to the property, a common industrial norm is to refer to the Kew Root Survey (Cutler and Richardson 1989), which gives maximum distances between (some / common) tree species and buildings within which varying percentages (50-90%) of reported damage occurred. The maximum distance for 75% of cases is often taken as a rule of thumb, but the percentage used (50-90% of cases) can be modified by both the frequency with which the species was recorded and the

frequency with which it caused damage (the damage to frequency ratio). The Institute of Structural Engineers (ISE) publishes tables based on this data. Where there is a divergence between the ISE's 'recommended' modified distance and that of Cutler and Richardson, a range is provided. The subject trees were assessed in Table 1 on this basis with the concurrence of trees with a high damage-to-frequency ratio growing at close distances, receiving increased levels of shading to suggest increased levels risk. Distances from the house in bold text denote trees that are closer than or close to their modified distance.

Of those species with roots encountered in trial pits, the birches (T32 & 33) and lime (T1) stand within statistically significant proximity to the coach house / studio, with lime having a high damage to frequency ratio and birch a relatively low one. The seat of damage is at the northern end of the coach house, nearer to lime (T1), and lime roots were discovered in the northern pit TP4. This tree has of course already been implicated in damage to garden structures and consented for felling (see p.1 second paragraph above). The anomaly here is the significant presence of plane roots in 2015's TP6, closest to T1. This pit stands at some (30m+) distance from the only obvious plane tree in the area (T25), with considerable intervening obstacles of level change and built infrastructure. It may be that another London plane in e.g. Pennethorne House was removed prior to 2015.

There are therefore various indicators that the damage apparent is, at least partly, the result of vegetation-related subsidence. We would recommend that, given the evidential requirements of the London Tree Officers Association's Risk Limitation Strategy for Tree Root Claims, particularly within Conservation Areas protecting trees and their amenity, further investigations be undertaken to confirm or reject this hypothesis. Such investigations should include identification of the roots found within the trial pits (usually facilitated by the site investigations team, as per the 2015 SI report, by way of a specialist laboratory service) and monitoring of site levels at locations determined by a structural engineer. The change of seasons / commencement of spring growth can be a useful moment to determine the influence of vegetation, and level monitoring can be helpful in distinguishing between multiple trees potentially implicated in subsidence (including the anomalous plane tree roots). Additional consideration should be given to the underpinning of the affected structures but ultimately, a decision on how to proceed should be made by a structural engineer and the insurer. Whilst we are mostly considering the occurrence of subsidence from continued tree growth, the structural engineers should also be consulted on the alternative risk of heave following the removal of T1 lime and any other proposed removals (e.g. T22 plum). Tree works recommended previously by ourselves and Harris Bugg Studio but not carried out, should be attended to as a matter of course and at the earliest convenience.

I should also address the possibility / risk from younger planting along the western wall of the coach house, within the neighbouring property (T27-32 as well as T33). Whilst there are no trees here with the recorded high damage-to-frequency ratio of a lime, the liquidambar or sweet gum remains a 'known unkown,' less frequently planted at the time of Cutler and Richardson's survey. We do know though that the species has the 'problematic' characteristics of a large and fast-growing parkland tree, reaching 28m height in some parts of the UK. Certainly, a casual search of websites in the US, where the tree is native, readily discovers advice to plant away from foundations and 'sidewalks', and to give enough room for the root system and tree generally. There is simply not enough room for this tree in this location, when we know already from site investigations that the soil is prone to ground movement (highly shrinkable, desiccated clay) which the existing foundations are unable to withstand without structural damage. I would recommend asking the neighbour to remove this tree at least. In all likelihood, any tree or even moderate shrub planting along this boundary carries a risk: we see already roots of shrubs / climbers in the trial pits just outside (TP1) and below (TP2) the vulnerable coach house structures. It is perhaps for others to say what amenities a neighbour should reasonably be allowed to enjoy and which vulnerabilities an owner should address in structural repair / improvement. Certainly, the neighbour would be advised to keep their planting in check (low-growing and routinely trimmed). It would be interesting to see what level monitoring revealed in this regard (of lesser vegetation influence).

In conclusion then, tree-related soil shrinkage or subsidence seems the most likely cause of structural damage, in the presence of a desiccated and highly shrinkable clay, with the lime (T1) as the most likely causal agent, given its proximity to the locus of damage, presence of roots in the adjacent trial pit (TP4) and overall high damage-to-frequency ratio. However, there may be other (or even alternative) agents or causes. We recommend the use of level monitoring to help determine a pattern of seasonal movement indicative of vegetative influence and a 'direction of travel' (level distortion) towards individual trees or shrubs. We recommend any outstanding tree works be carried out and further reviewed in the light of level monitoring. Regardless of level monitoring, we recommend the neighbour be approached on the subject of removing their liquidambar and maintaining other vegetation to alleviate future risk to the property. I would also recommend a structural engineer give thought to deepening / future proofing the foundations themselves, and at the very least, a heave risk assessment be carried out in the light of the proposed felling.

To aid investigations, I have enclosed the aforementioned survey plan and species metric table for the trees around the coach house and studio, and the original root identification letter. The Harris Bugg Studio report of tree works recommended (but incompletely undertaken) is also included. As indicated above, the felling works will be of interest to the structural engineer (reference further heave risk assessment). I trust the above provides sufficient information but please do not hesitate to get in touch if you require further assistance.

Encs: Table 1. Statistical analyses of tree species in relation to subsidence claims
Root Identification Letter
C737 P 31012019 Proposed arboricultural works
Landmark Trees Survey Plan

Table 1: statistical analyses of tree species in relation to subsidence claims
* Not assessed due to restricted access

ID No(s).	Species	Maturity	Amenity Value	Damage to Frequency Ratio	Distance (m) from closest point of coach house / studio	Distance (m) beyond which trees are unlikely to be relevant.	Modified distance (m) for relevant % of cases.	Notes
1	Common lime	M	Moderate	1.28	4.7	20.0	8 – 11 (for 75% to 90%)	To be felled. Lime roots in TP4
32	Silver birch	EM	Low	0.31	0.8	10.0	4 – 7 (for 50% to 75%)	Remote survey only Birch roots in TP1(?) &2
31	Liquidambar	SM*	Low	**Not known**	1.4	**Not known**	**Not known**	Remote survey only. Fast-growing species to 28m height
30	Persian ironwood	SM*	Low	**Not known**	1.2	**Not known**	**Not known**	Remote survey only
29	Southern magnolia	SM*	Low	**Not known / Low**	0.7	**Not known /** 5 for magnolias	**Not known**	Remote survey only
28	Cherry	EM	Low	0.44	1.6	11.0	3 – 6 (for 50% to 75%)	Remote survey only
27	Pittosporum	EM	Low	**Not known**	0.7	**Not known**	**Not known**	Remote survey only
33	Silver birch	M	Moderate	0.31	5.1	10.0	4 – 7 (for 50% to 75%)	Remote survey only Birch roots in TP1(?) &2
22	Myrobalan plum	EM	Low	0.44	3.8	11.0	3 – 6 (for 50% to 75%)	To be felled
25	London plane	M	High	0.80	15.4	15.0	7.5 – 10 (for 75% to 90%)	Plane roots in TP6 but at 30m+ distance

Richardson's Botanical Identifications

Root identification
Vegetation surveys
Tree/Building investigations
Plant taxonomy

Dr Ian B K Richardson
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James Richardson
BSc (Hons. Biology)

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Conisbee & Associates
4 Offord Street
LONDON
N1 1DH

Your ref: **140627 - N. Nicholls**

10/04/2015

Our ref: 73/8701

Dear Sirs

Park Village West

The samples you sent in relation to the above on 01/04/2015 have been examined. The structure was referable as follows (please note that no roots were found in TP3 (Internal coach house and PW with No 13 Park Village West)):

TP1 (External front elevation of coach house and PW with No 13 Park Village West), 0.25m

1 root: could well be CARPINUS (Hornbeam). Tentative - this sample was in POOR condition. Alive, recently*.

TP1 (External front elevation of coach house and PW with No 13 Park Village West), 0.70m

1 root: the family VITACEAE (Vitis (Grape-Vine), Parthenocissus (Virginia Creeper etc.)). Alive, recently*.

1 root: BETULA (Birch). A further sample, not examined in detail appeared similar under low magnification. Dead*.

TP2 (Internal coach house and PW with No 13 Park Village West), 0.60m

1 root: the family VITACEAE (Vitis (Grape-Vine), Parthenocissus (Virginia Creeper etc.)). Alive, recently*.

TP2 (Internal coach house and PW with No 13 Park Village West), 0.70m

1 root: the family VITACEAE (Vitis (Grape-Vine), Parthenocissus (Virginia Creeper etc.)). A further sample, not examined in detail appeared similar under low magnification. Alive, recently*.

TP2 (Internal coach house and PW with No 13 Park Village West), 1.40m

1 root: a SHRUB, similar in some ways to AUCUBA (evergreen shrubs, often with large, variegated leaves). Tentative. Dead*.

TP4 (External rear elevation of coach adjacent to boundary with Pennethorne House and PW with No 13 Park Village West), 0.10m

1 root: HEDERA (Ivy); also the related FATSIA (a robust shrub with fig-like leaves). 7 further

roots, not examined in detail appeared similar under low magnification. Alive, recently*.

1 root: TILIA (Lime). Alive, recently*.

9 samples: unfortunately insufficient cells for identification.

TP6, 0.20m

1 root: PLATANUS (Plane). Dead*.

TP6 (External rear elevation of coach adjacent to boundary with Pennethorne House), 0.60m

1 root: PLATANUS (Plane). Alive, recently*.

TP6 (External rear elevation of coach adjacent to boundary with Pennethorne House), 0.70m

1 root: PLATANUS (Plane). Alive, recently*.

TP6 (External rear elevation of coach adjacent to boundary with Pennethorne House), 0.80m

1 root: PLATANUS (Plane). 4 further roots, not examined in detail appeared similar under low magnification. Dead*.

I trust this is of help. Please call us if you have any queries; our Invoice is enclosed.

Yours faithfully

Dr Ian B K Richardson

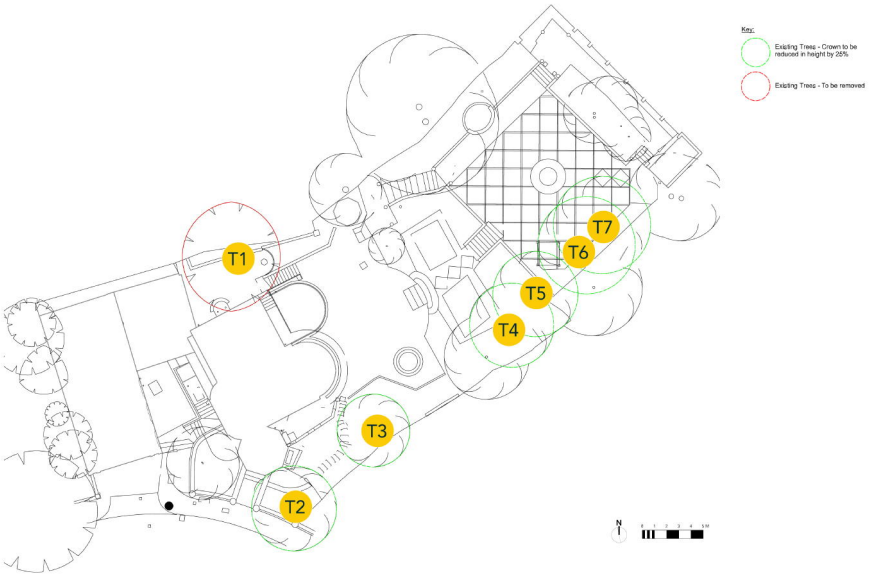
* Based mainly on the Iodine test for starch. Starch is present in some cells of a living woody root, but is more or less rapidly broken down by soil micro-organisms on death of the root, sometimes before decay is evident. This result need not reflect the state of the parent tree.

Identified with no information on vegetation, on or off site.

HARRIS
BUGG
STUDIO

12 Park Village West, London
C737-P-31012019 Proposed arboricultural works

PROPOSED ARBORICULTURAL WORKS

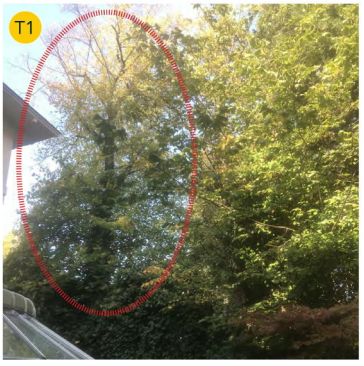


PROPOSED ARBORICULTURAL WORKS

Reference	**Botanical name**	**Common name**	**Height (metres)** (approx.)*	**Canopy diameter (metres)** (approx.)*
T1	Tilia x europaea	Lime	12	6
T2	Laurus nobilis	Bay	6	4
T3	Laurus nobilis	Bay	6	5
T4	Laurus nobilis	Bay	7	4
T5	Tilia x europaea	Lime	12	5
T6	Acer pseudoplatanus	Sycamore	12	5
T7	Acer pseudoplatanus	Sycamore	12	5

* Please note that these are estimated amounts based on initial visual assessments.

PROPOSED ARBORICULTURAL WORKS: REMOVAL AND REPLACEMENT



T1: Removal of lime tree on the boundary of the property. Tree roots causing extensive movement to the fabric of the garden and to the ground around the property, undermining stability and structures.

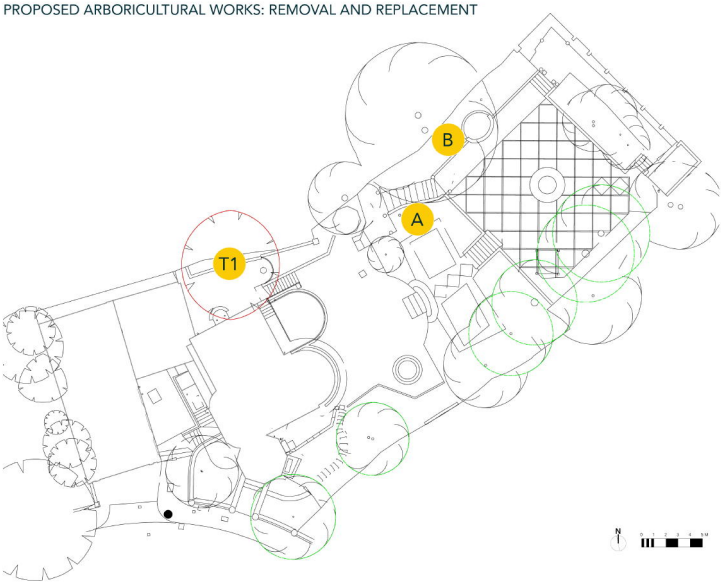
Options have been explored and tested to retain the tree, but a satisfactory, long-term solution that would include the retention of the tree has not been reached.
Design testing has included:

1) Extending the entire planting bed into the terrace area. This would hinder access to the house and compromise the currently clear aspect towards the listed building from elsewhere on the property;

2) Extending the planting bed in a localised zone immediately around the rootball area. This would appear out of character with the rest of the hard landscaping within the garden, and would only prolong an issue that has already been identified due to the continued growth of the tree and rootball.

Following exploration of the above potential approaches, a practical and long-term solution would be the removal of T1 and its replacement elsewhere in the garden with a tree more appropriate to the scale of the locality and site conditions. Please see the following page for further information on suggested alternatives.

PROPOSED ARBORICULTURAL WORKS: REMOVAL AND REPLACEMENT



T1: Lime tree for removal

A: Option A location for replacement tree

B: Option B location for replacement tree

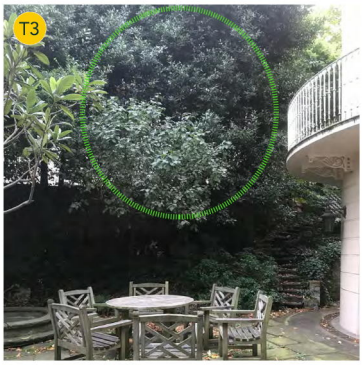
It is proposed that a replacement tree will be planted within the garden to compensate for the removal of T1, with proposed locations shown as 'A' and 'B' on the plan opposite. Note that for a small garden with an already high proportion of medium-to-large trees, replanting like-for-like would not be in the long term interests of the tree due to the pressures of competition for establishment. A smaller species that can tolerate partial shade from the larger, surrounding trees would be more suitable to such conditions and be more likely to establish satisfactorily.

Suggested suitable replacements include (but are not limited to):

- Acer palmatum spp.;
- Cercidiphyllum japonicum;
- Prunus spp.;
- Sophora japonica;
- Sorbus sargentiana;
- Zelkova serrata.

PROPOSED ARBORICULTURAL WORKS: REDUCTIONS

T2: Bay tree to be reduced in height by 25% to provide more light to the garden and to be able to actively manage its size, spread, health and longevity. This will also help mitigate the excessive shading of the house and the neighbouring property caused by the tree.

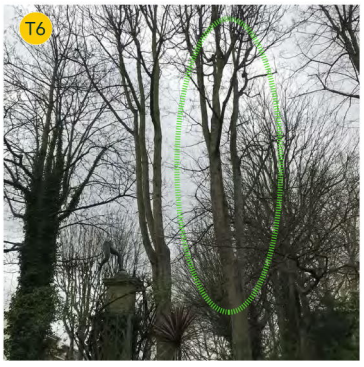


T3: Bay tree to be reduced in height by 25% to provide more light to the garden and to be able to actively manage its size, spread, health and longevity. This will also help mitigate the excessive shading of the property caused by the tree.

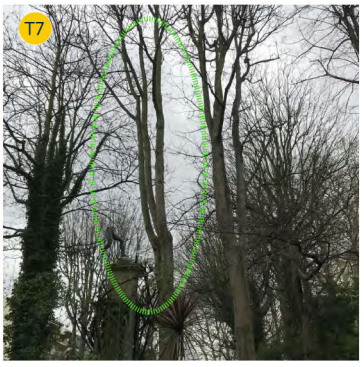
T4: Bay tree to be reduced in height by 25% to provide more light to the garden and to be able to actively manage its size, spread, health and longevity. This will also help mitigate the excessive shading of the garden caused by the tree.

PROPOSED ARBORICULTURAL WORKS: REDUCTIONS

T5: Lime tree to be reduced in height by 25% to provide more light to the garden and to be able to actively manage its size, spread, health and longevity. This will also help mitigate the excessive shading of the garden caused by the tree.



T6: Sycamore tree to be reduced in height by 25% to provide more light to the garden and to be able to actively manage its size and spread. This reduction would also continue the earlier maintenance regime where the tree height was reduced in the past.



T7: Sycamore tree to be reduced in height by 25% to provide more light to the garden and to be able to actively manage its size and spread. This reduction would also continue the earlier maintenance regime where the tree height was reduced in the past.

HARRIS
BUGG
STUDIO

Harris Bugg Studio Ltd

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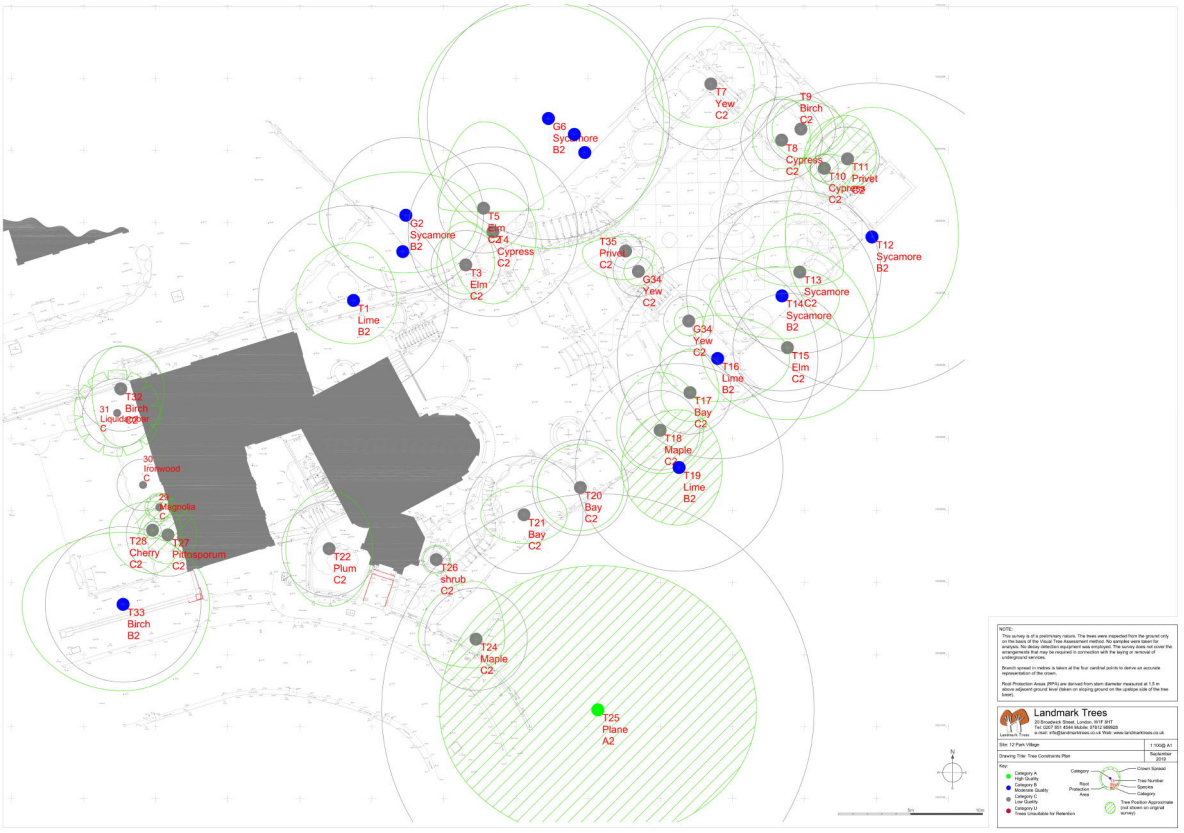
T7
Yew
C2
T9
Birch
C2
G6
Sycamore
B2
T8
Cypress
C2
T11
Privet
C2
T10
Cypress
C2
G2
Sycamore
B2
T5
Elm
C2
T4
Cypress
C2
T3
Elm
C2
T35
Privet
C2
G34
Yew
C2
T12
Sycamore
B2
T1
Lime
B2
T13
Sycamore
C2
T14
Sycamore
B2
G34
Yew
C2
T15
Elm
C2
T16
Lime
B2
T32
Birch
C2
31
Liquidamber
C
T17
Bay
C2
T18
Maple
C2
T19
Lime
B2
30
Ironwood
C
29
Magnolia
C
T28
Cherry
C2
T27
Pittosporum
C2
T20
Bay
C2
T21
Bay
C2
T22
Plum
C2
T26
shrub
C2
T33
Birch
B2
T24
Maple
C2
T25
Plane
A2
N
NOTE:
This survey is of a preliminary nature. The trees were inspected from the ground only and in accordance of the Visual Tree Assessment method. No samples were taken for analysis. No decay detection equipment was employed. The survey does not cover the arrangements that may be required in connection with the laying or removal of underground services.
Branch spread in metres is taken at the four cardinal points to derive an accurate representation of the crown.
Root Protection Areas (RPA) are derived from stem diameter measured at 1.5 m above adjacent ground level (taken on sloping ground on the upslope side of the tree base).
Landmark Trees
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e-mail: info@landmarktrees.co.uk Web: www.landmarktrees.co.uk
Site: 12 Park Village
1:100@ A1
Drawing Title: Tree Constraints Plan
September 2019
Key:
Category A
High Quality
Category B
Moderate Quality
Category C
Low Quality
Category U
Trees Unsuitable for Retention
Category
Root Protection Area
Crown Spread
Tree Number
Species
Category
Tree Position Approximate (not shown on original survey)